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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,670	06/26/2003	Songlin Xu	007898/ALRT/ETCH	8300

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MOSER, PATTERSON & SHERIDAN, LLP
APPLIED MATERIALS INC
595 SHREWSBURY AVE
SUITE 100
SHREWSBURY, NJ 07702

EXAMINER	
VINH, LAN	

ART UNIT	PAPER NUMBER
1765	

DATE MAILED: 09/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/608,670	XU ET AL.	
	Examiner	Art Unit	
	Lan Vinh	1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 June 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26 and 31-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5, 7-15, 17-23, 25-26,31-33* is/are rejected.

7)☒ Claim(s) *6,16 and 24* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 17, 25, 26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 17 recites the limitation "the probing gas" in claim 11. There is insufficient antecedent basis for this limitation in the claim.

Claims 25, 26 recite the limitation "the probing gas" in claim 19. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-5, 7-10, 19-23, 25-26, 31, 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (US 6,797,634) in view of Golovato et al (6,143,144)

Suzuki discloses a method for conditioning an etching chamber. The method comprising the steps of:

inserting a non-production wafer into a plasma chamber (col 5, lines 60-61)

injecting a probing gas/conditioning gas of O2 and Ar into a plasma chamber (col 15, lines 35-37), which reads on injecting a probing gas into the plasma chamber, the probing gas comprises O/source of free radicals since oxygen is defined as a source of free radicals in page 3 of the specification

striking the probing gas/conditioning gas into a probing plasma (col 12, lines 35-40)

measuring the emission intensities of the species in the probing plasma to determine the end point of the plasma (col 15, lines 22-25) and cleaning the chamber using the conditioning gas (col 16, lines 53-56), which reads on measuring the emission intensities of the radicals in the probing plasma to determine whether to commence a plasma process/determining an extent of process drift on the basis of the measured emission intensities/determining the extent of the plasma cleaning/process drift

Unlike the instant claimed inventions as per claims 1, 4, 19, 20, Suzuki fails to specifically disclose measuring a density of the free radical/a ratio of emission intensities of the free radical and the inert gas and whether to commence plasma processing of the wafer on the basis of the measured density of the free radical

Golovato discloses a method for etch rate enhancement comprises the steps of measuring the emission intensities /ratio of the emission intensities of oxygen/free radical and Ar in the probing/conditioning plasma (Fig. 6), and to commence plasma processing of the wafer on the basis of the measured density of the free radical/oxygen (col 11, lines 52-55)

Since Suzuki is directed to a method for conditioning an etching chamber using oxygen-containing plasma, one skilled in the art at the time the invention was made would have found it obvious to modify Suzuki method by adding the step of measuring the emission intensities of free radicals/ratio of emission intensities/the density of the free radicals in the probing/conditioning plasma and comparing the ratio of emission intensities between the free radicals with a first and a second levels as per Golovato because Golovato discloses that the emission intensity from oxygen and argon are compared to determine the origin of the undesired activated oxygen (col 11, lines 20-25)

Regarding claims 2, 9, 10, 20, 25-26, 31, 33, Suzuki discloses that the plasma includes oxygen radical as a main component and argon (col 16, lines 4-5, lines 62-64)

Regarding claims 3, 21, one skilled in the art at the time the invention was made would have found it obvious to modify Suzuki by selecting a suitable control parameter/variable such as argon flow rate for obtaining the best result

Regarding claim 8, Suzuki discloses the step of measuring radical and the time of the conditioning may be increased from the standard condition (col 11, lines 45-49)

4. Claims 11-15, 17-18, 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (US 6,797,634) in view of Golovato et al (6,143,144)

Suzuki discloses a method for conditioning an etching chamber. The method comprising the steps of:

injecting a conditioning gas mixture of O2 and Ar into a plasma chamber (col 15, lines 35-37), which reads on injecting a seasoning gas into the plasma chamber, the seasoning gas comprises O/source of free radicals since oxygen is defined as a source of free radicals in page 3 of the specification

striking the conditioning gas/seasoning gas into a probing plasma (col 12, lines 35-40)

conditioning/seasoning the chamber (col 16, lines 53-58)

measuring the emission intensities of the species in the conditioning plasma to determine the end point of the plasma (col 15, lines 22-25) and cleaning the chamber using the conditioning gas (col 16, lines 53-56), which reads on measuring the emission intensities of the radicals in the plasma to determine when the plasma is seasoned based on the basis of the measured emission intensities

Unlike the instant claimed inventions as per claims 11, 14, Suzuki fails to specifically disclose measuring a density of the free radical/a ratio of emission intensities of the free radical and the inert gas and determining when the plasma chamber is seasoned according to the measured density of the free radical

Golovato discloses a method for etch rate enhancement comprises the steps of measuring the emission intensities /ratio of the emission intensities of oxygen/free

radical and Ar in the probing/conditioning plasma (Fig. 6), and to commence plasma processing of the wafer on the basis of the measured density of the free radical/oxygen (col 11, lines 52-55)

Since Suzuki is directed to a method for conditioning an etching chamber using oxygen-containing plasma, one skilled in the art at the time the invention was made would have found it obvious to modify Suzuki method by adding the step of measuring the emission intensities of free radicals/ratio of emission intensities/the density of the free radicals in the probing/conditioning plasma and comparing the ratio of emission intensities between the free radicals with a first and a second levels as per Golovato because Golovato discloses that the emission intensity from oxygen and argon are compared to determine the origin of the undesired activated oxygen (col 11, lines 20-25)

Regarding claims 12, 17, 18, 32, Suzuki discloses that the plasma includes oxygen radical as a main component and argon (col 16, lines 4-5, lines 62-64)

Regarding claim 13, one skilled in the art at the time the invention was made would have found it obvious to modify Suzuki by selecting a suitable control parameter/variable such as argon flow rate for obtaining the best result

Allowable Subject Matter

5. Claims 6, 16, 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Zhong et al (US 6,124,927) discloses the step of determining the end-point of a cleaning based on the emission intensities of the species (col 3, lines 15-17)

Response to Arguments

7. Applicant's arguments filed 6/24/2005 have been fully considered but they are not persuasive.

Applicants argue that Golovado does not teach or suggest measuring a density of free radical, utilizing the density of free radicals as a process control parameter. This argument is unpersuasive for the following reasons: the argument that Golovado does not teach or suggest utilizing the density of free radicals as a process control parameter does not commensurate with the scope of claims 1, 11, 19 because the claims do not recite/require the limitation of "utilizing the density of free radicals as a process control parameter", as shown in fig. 6 of Golovado, Golovado discloses measuring the emission intensities of oxygen and Ar/ratio of the emission intensities of oxygen/free radical and argon which is defined as the density of free radical

Applicants further argue that Golovato does not teach or suggest a modification to the etch chamber conditioning process described by Suzuki. This argument is unpersuasive because as recited in col 9, lines 15-20 of Golovato, Golovato discloses that the oxygen produced from the series of sputter etch is stored up on the dielectric wall of the chamber.The examiner asserts that that Golovato teaches or suggests a modification to

the etch chamber conditioning process, thus, one skilled in the art at the time the invention was made would have found it obvious to employ Golovato teaching in the conditioning process of Suzuki to produce the claimed invention

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Vinh whose telephone number is 571 272 1471. The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LV
August 29, 2005